POTLATCH CORPORATION (PWS 2350024)
SOURCE WATER ASSESSMENT FINAL REPORT

August 5, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated source water assessment area and sensitivity factors associated with the well and aquifer characteristics.

This report, *Source Water Assessment for Potlatch Corporation, Lewiston, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, i.e. nitrates, arsenic), volatile organic contaminants (VOCs, i.e. petroleum products), synthetic organic contaminants (SOCs, i.e. pesticides), and microbial contaminants (i.e. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

The Potlatch Corporation drinking water system consists of three ground water wells. Wells #1 and #5 are active wells and Well #2 has been offline since the end of 1999 after it went dry. Since Well #2 has not been properly abandoned, a susceptibility analysis was still conducted. Wells #1 and #2 share the same delineation and, therefore, land uses. Well #1 SWML W and Well #2 SWML E have high susceptibility ratings to IOCs, VOCs, SOCs, and microbial contamination. These high ratings are mostly a result of a lack of well log information. In the case of the VOC rating, Well #1 SWML W has an automatic high susceptibility due to detections of Trichloroethylene (TCE). Well #2 SWML E has an automatic high susceptibility due to detections of various VOC chemicals, including tetracloroetylene, TCE, and cis-1,2-Dichloroethylene. Well #5 PLP/PPR has a moderate susceptibility rating to all classes of contaminants. A lack of potential contaminant sources within the 3-year time-of-travel zone is the main factor for the reduced scores.

For the assessment, a review of laboratory tests was conducted using the Idaho Drinking Water Information Management System (DWIMS), the State Drinking Water Information System (SDWIS), and Potlatch Corporation records. The IOCs antimony, arsenic, barium, beryllium, cadmium, chromium, fluoride, mercury, nitrate, selenium, and thallium have been detected in routine water well samples, but each chemical has been below the maximum contaminant levels (MCLs) as set by the EPA. In October 1998, Well #1 SWML W water had VOC detections of Dichloromethance and TCE. TCE was also detected in September 1999. In September 1993, Well #2 SWML E water had VOC detections of Cis-1,2-Dichloroethylene, Tetrachloroethylene, and TCE. TCE has also been detected in Well #2 SWML E water in February 1997, September 1997, December 1997, February 1998,

September 1998, and September 1999. Since 1999, the only VOCs detected have been trihalomethanes. No SOCs or bacterial contaminants have ever been detected in the tested water.

Another concern for the system is the recurring problem of the disinfection byproducts bromodichloromethane, bromoform, chlorodibromomethane, and chloroform, commonly referred to as trihalomethanes. These VOC contaminants have been detected from 1993 to 1998. They are the result of chlorine being injected before the first sample tap, and are not considered to be associated with the source water. As there have been chemical problems with the system water, Potlatch Corporation should be aware that the potential for contamination from the aquifer exists. Though Nez Perce County is rated as having high herbicide use, this land use was not factored into the analysis because the source delineation predominantly encompasses an urban area.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the Potlatch Corporation system, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity), including protection of the well from contamination sources within 50 feet of the wellhead. Also, disinfection practices should be maintained. No chemicals should be stored or applied within the 50-foot radius of the wellhead. The source of the TCE in the water should be investigated and remediated. Since much of the designated protection areas are outside the direct jurisdiction of the Potlatch Corporation, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of source water protection. In addition, the well should maintain sanitary survey standards regarding wellhead protection.

Appropriate disinfection practices need to be maintained in a way to protect the drinking water from disinfection by-products, a result of the chlorination disinfection. Though water cannot be totally free of by-products when disinfection is used, they can be reduced by treatment modifications. For disinfection by-product control strategies, see http://www.epa.gov/safewater/mdbp/pdf/alter/ chapt_2.pdf.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation encompasses much urban and residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are transportation corridors through the delineations, the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR POTLATCH CORPORATION, LEWISTON, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment is also included.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The non-community non-transient public drinking water system for the Potlatch Corporation is comprised of two active ground water wells (#1 and #5) and one inactive ground water well (#2) that serve approximately 1,800 people through one connection. The wells are located in Nez Perce County, along the Clearwater River on the north-eastern side of the City of Lewiston (Figure 1).

The most significant potential water problem currently affecting Potlatch Corporation is that of volatile organic contamination. In October 1998, Well #1 SWML W water had VOC detections of Dichloromethance and TCE. TCE was also detected in September 1999. In September 1993, Well #2 SWML E water had VOC detections of Cis-1,2-Dichloroethylene, Tetrachloroethylene, and TCE. TCE has also been detected in Well #2 SWML E water in February 1997, September 1997, December 1997, February 1998, September 1998, and September 1999.

Another concern for the system is the recurring problem of the disinfection byproducts bromodichloromethane, bromoform, chlorodibromomethane, and chloroform. These VOC contaminants have been detected from 1993 to 1998. They are the result of chlorination practices, and are not considered to be associated with the source water.

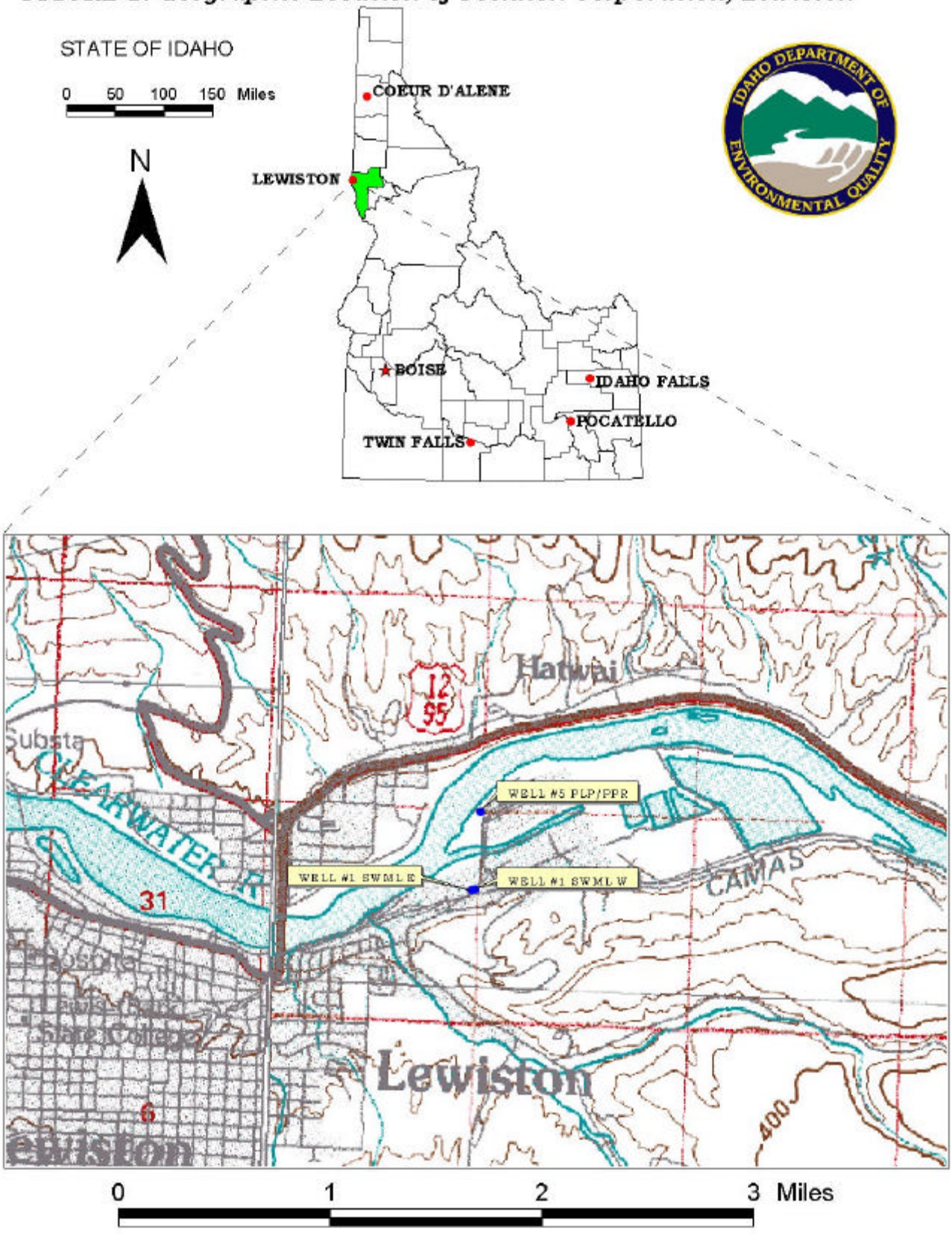
The IOCs antimony, arsenic, barium, beryllium, cadmium, chromium, fluoride, mercury, nitrate, selenium, and thallium have been detected in routine water well samples, but each chemical has been below the maximum contaminant levels (MCLs) as set by the EPA. No SOCs or bacterial contaminants have ever been detected in the tested water.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ contracted with the University of Idaho to perform the delineations using a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Grande Ronde aquifer of the Clearwater Plateau in the vicinity of the Potlatch Corporation well. The computer model used site specific data, assimilated by the University of Idaho from a variety of sources including the Potlatch Corporation operator input, local area well logs, and hydrogeologic reports (detailed below).

The Grande Ronde Formation of the Columbia River Basalt Flows provides most of the ground water pumped in the vicinity of Lewiston because of its great thickness, extensive lateral continuity, and lack of fine-grained interbeds. Grande Ronde wells in the vicinity of Lewiston produce up to 2000 gallons per minute. The Grande Ronde is easily accessible to drilling at the confluence of the Clearwater and Snake Rivers and some of the tributary valleys such as Lapwai Creek where it has been exposed by erosion (Crosthwaite, 1989). The Grande Ronde aquifer at Lewiston is called the “Lewiston Aquifer” (EPA, 1988), as well as the “Lewiston Basin Deep Aquifer” (Wyatt-Jaykim, 1994).

FIGURE 1. Geographic Location of Potlatch Corporation, Lewiston



Major faults, anticlinal folds, and a major topographic divide (the Blue Mountains) have been assumed by various parties (EPA, 1988; Wyatt-Jaykim, 1994) to form the regional impermeable boundaries of the Lewiston Basin Deep Aquifer. To the north, the Clearwater Escarpment, commonly referred to as the Lewiston Hill bound the aquifer. Faults at the toe of Lewiston Hill include the Vista and Wilma faults. The northeastern boundary of the Lewiston Basin Deep Aquifer is taken to be the Cottonwood Creek Fault. The southeastern boundary is the Limekiln fault along the front of the Craig Mountains, which meets the Snake River at Limekiln rapids. From the Snake River westward, the Grande Ronde fault is considered to be the southern boundary of the Aquifer, until it meets the Blue Mountain topographic divide. This major topographic divide is assumed to be a regional groundwater divide.

Within the Lewiston Basin Deep Aquifer, water is generally assumed to flow from recharge in the highlands to discharge into the Snake and Clearwater Rivers. In addition, Cohen and Ralston (1980) mapped areas of possible river/aquifer interconnection, and proposed that (a) the aquifer discharges to the Snake below Lewiston, and (b) the aquifer is recharged from surface water from Lapwai Creek plus the Clearwater in the reach intersecting Lapwai Creek, and (c) that the aquifer is recharged from surface water in the vicinity of the confluence of the Snake River with Asotin Creek. These locations for surface water recharge to the aquifer were postulated where the basalt is dipping away from the creek.

Lack of complete understanding of the system caused two different modeling scenarios to be tested. One model assumes that the aquifer is in complete hydraulic connection with Clearwater and Snake Rivers. The other "end member" alternative only allows for hydraulic connection in the vicinity of Lewiston at locations (a), (b), and (c) described above and also the far-field upstream Snake River. The actual response of these pumping wells to the integrated hydrologic stresses of the locale are probably somewhere in the middle.

Precipitation is approximately 13 inches/year in Lewiston-Clarkston, whereas nearby, higher elevation areas average close to 25 inches annually (Cohen and Ralston, 1980). A modeling effort documented by Wyatt-Jaykim (1994), concluded on the basis of available data that 1 to 2 inches/year is a conservative estimate for recharge to the basalt aquifers in the vicinity of Lewiston and Lewiston Orchards. This ignores irrigation losses that would contribute to recharge of the basalts overlying the Grande Ronde in the vicinity of the Lewiston Orchards.

The delineated source water assessment area for the Potlatch Corporation Well #1 SWML W and Well #2 SWML E can best be described as a corridor approximately 2 miles long and ½ miles wide extending to the east of the Potlatch Corporation crossing the Clearwater River on the eastern side of the City of Lewiston (Figure 2). The delineated source water assessment area for the Potlatch Corporation Well #5 PLP/PPR can best be described as a corridor approximately 1.5 miles long and 1 mile wide extending to the northeast of the Potlatch Corporation crossing the Clearwater River on the eastern side of the City of Lewiston (Figure 3). The actual data used by the University of Idaho in determining the source water assessment delineation areas are available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the immediate area of the Potlatch Corporation wellhead consists of a sawmill and wood production manufacturing plant, while the surrounding area is predominantly urban, industrial, and open water.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in December 2001 through March 2002. The first phase involved identifying and documenting potential contaminant sources within the Potlatch Corporation source water assessment areas (Figures 2 and 3) through the use of computer databases and Geographic Information System maps developed by DEQ. In some cases, such as a gas station, the same site will be identified on various databases. In such cases, each site is only counted one time. The second, or enhanced, phase of the contaminant inventory involved contacting the City of Lewiston Planning and Zoning Commission and updating the business databases to match 2001 conditions. Additionally, Potlatch Corporation conducted an additional on-the-ground verification of the identified potential contaminant sites.

The delineated source water areas encompasses tube-shaped corridors of land between the well sites and points to the east. The Well #1 SWML W and Well #2 SWML E delineation (Table 1, Figure 2) has 10 potential contaminant sites, 4 of which were identified on multiple databases. Those in the 3-year TOT include underground storage tanks (USTs), an above ground storage tank (AST), and sites related to the railroad and automobile wrecking. Other TOT sections contain sites related to Potlatch Corporation (a toxic release inventory site, UST, AST), an animal shelter, and one gravel pit. In addition, the delineation crosses the Clearwater River and the Camas Prairie Railroad. In the unlikely event of a spill along either of these transportation corridors, all types of contaminants could be added to the aquifer.

Figure 2. Potlatch Corp. Delineation Map and Potential Contaminant Source Locations

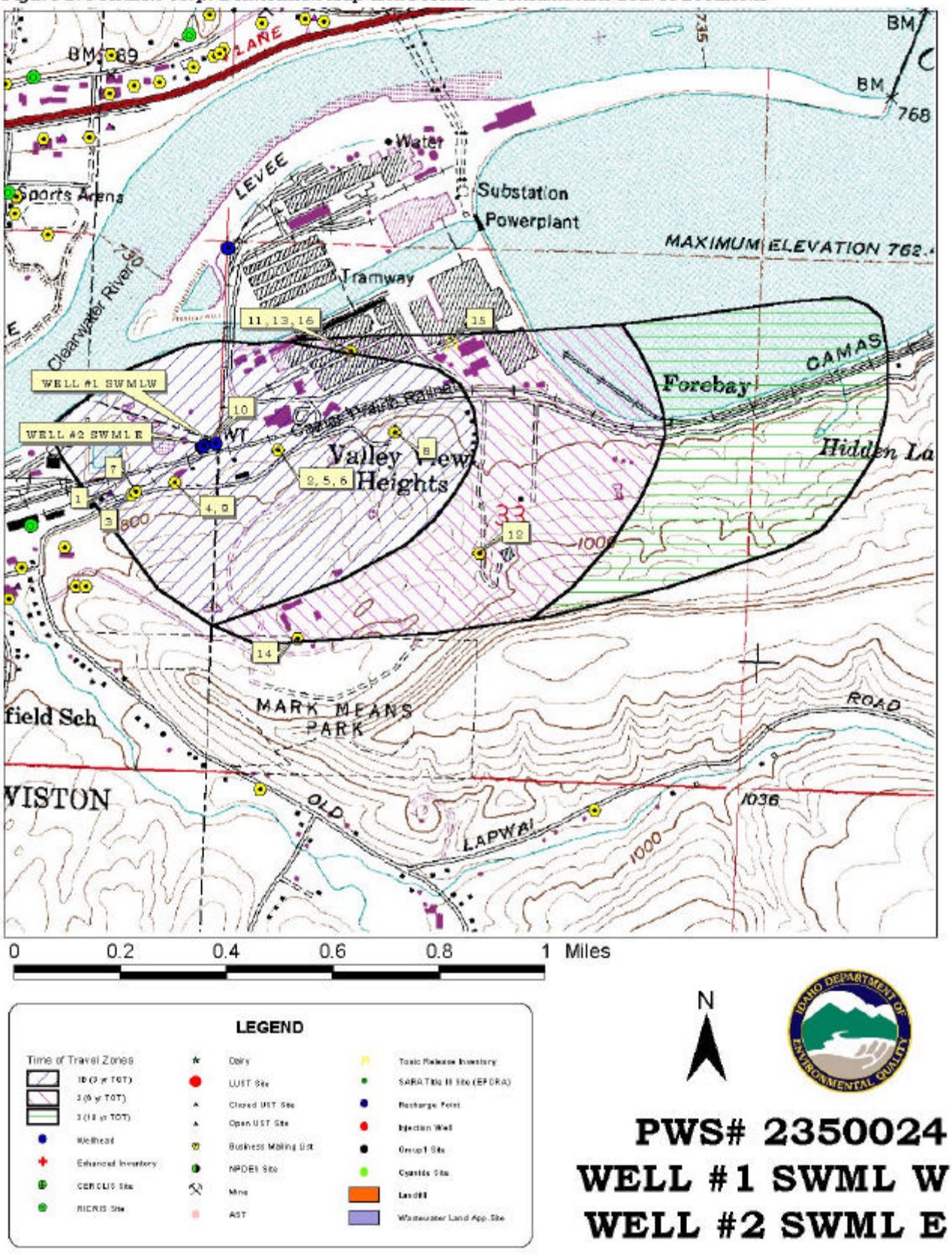


Table 1. Potlatch Corporation Wells #1 SWML W and #2 SWML E, Potential Contaminant Inventory

Site #	Source Description[1]	TOT ZONE[2]	Source of Information	Potential Contaminants[3]
1, 3	UST site - closed; Railroads	0-3	Database Search	IOC, VOC, SOC, Microbials
2, 5, 6	UST site – closed; Automobile Wrecking (Wholesale); Wrecker Service	0-3	Database Search	IOC, VOC, SOC
4, 9	Oils-Fuel (Wholesale); AST	0-3	Database Search	VOC, SOC
7	RAILCAR REPAIR	0-3	Database Search	IOC, VOC, SOC
8	AUTO WRECKING	0-3	Database Search	IOC, VOC, SOC
10	Group1 - PCE	0-3	Database Search	VOC
11, 13, 16	UST site industrial – closed; Sawmills; AST	3-6	Database Search	IOC, VOC, SOC
12	Animal Shelters	3-6	Database Search	IOC, VOC
14	GRAVEL PIT	3-6	Database Search	IOC, VOC, SOC
15	TRI site	3-6	Database Search	IOC, VOC, SOC
	Clearwater River	0-10	GIS Map	IOC, VOC, SOC, Microbes
	Camas Prairie Railroad	0-10	GIS Map	IOC, VOC, SOC, Microbes

[1] UST = underground storage tank, AST = above ground storage tank, PCE = tetrachloroethylene, TRI = toxic release inventory

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

The Well #5 PLP/PPR delineation (Table 2, Figure 3) has 15 potential contaminant sites, three of which were identified on multiple databases. In the 3-year TOT, there are only the Clearwater River, Highway 95, and a gas appliance business as potential contaminant sources. Other TOT sections contain sites with USTs, building businesses, manufacturing, power companies, and two sites regulated under the Resource Conservation and Recovery Act (RCRA).

Table 2. Potlatch Corporation Well #5 PLP/PPR, Potential Contaminant Inventory

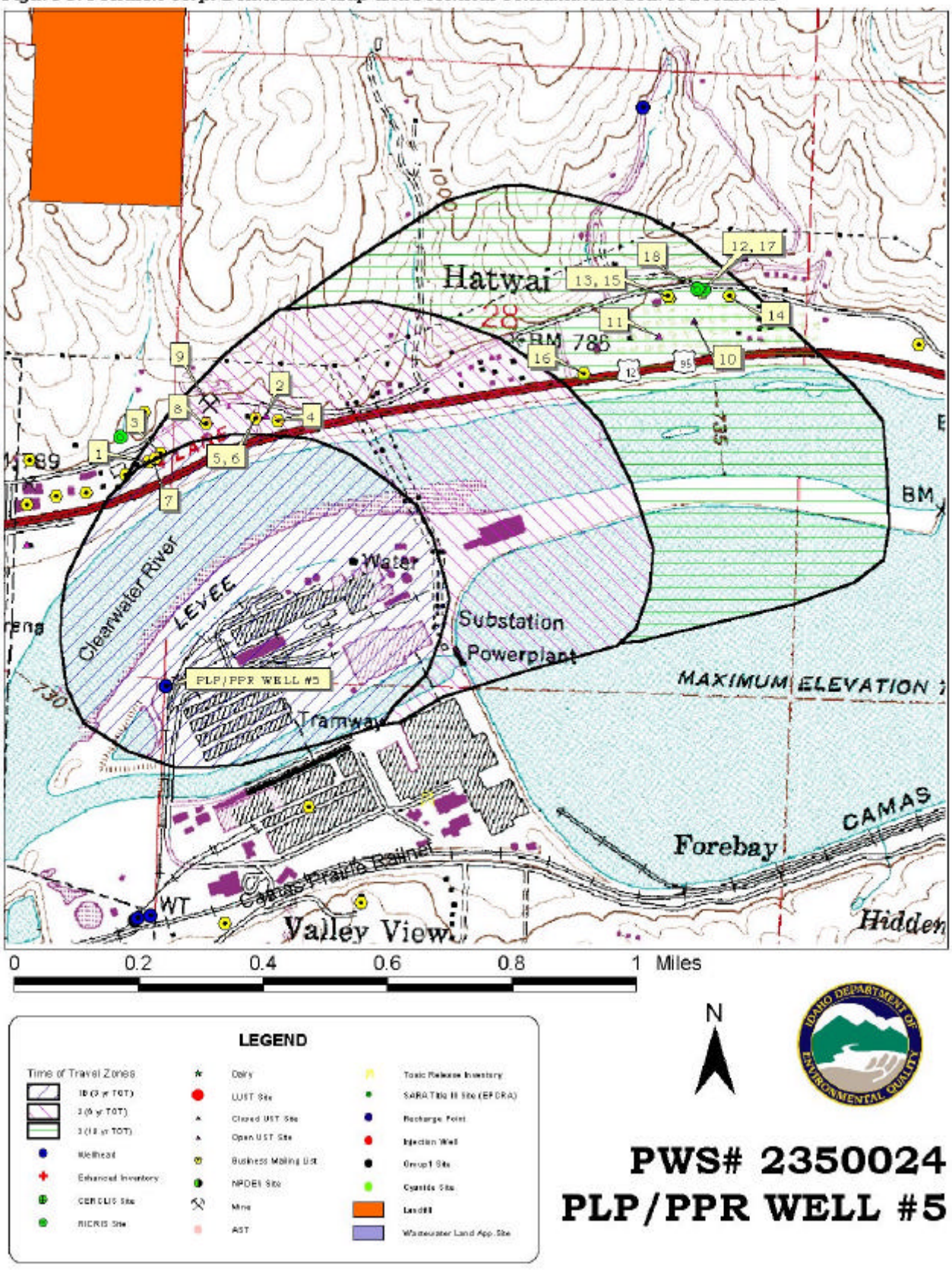
Site #	Source Description[1]	TOT ZONE[2]	Source of Information	Potential Contaminants[3]
1	Stove Shop	0-3	Database Search	IOC, VOC, SOC
2, 4	UST site - open; Gas station and store	3-6	Database Search	IOC, VOC, SOC
3	Buildings-Pre-Cut Prefab & Modular	3-6	Database Search	IOC, VOC, SOC
5	Marine Engine Manufacturer	3-6	Database Search	IOC, VOC, SOC
6	Rifle Manufacturer	3-6	Database Search	IOC, VOC, SOC
7	Trailer Sales	3-6	Database Search	IOC, VOC, SOC
8	Truck Outfitters	3-6	Database Search	IOC, VOC, SOC
9	Sand and Gravel pit	3-6	Database Search	IOC, VOC, SOC
10	UST site - closed	6-10	Database Search	VOC, SOC
11	UST site - open	6-10	Database Search	IOC, VOC
12, 17	Drilling & Boring Contractors; RCRA site	6-10	Database Search	IOC, VOC, SOC
13	Electric companies	6-10	Database Search	IOC, VOC
14	Tire-Retreading & Repairing	6-10	Database Search	IOC, VOC, SOC
15	Propane Company	6-10	Database Search	VOC, SOC
16	Home Center	6-10	Database Search	IOC, VOC, SOC
18	RCRA site	6-10	Database Search	IOC, VOC, SOC
	Clearwater River	0-10	GIS Map	IOC, VOC, SOC, Microbes
	Highway 95	0-10	GIS Map	IOC, VOC, SOC, Microbes

[1] UST = underground storage tank, RCRA = Resource Conservation and Recovery Act

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Figure 3. Potlatch Corp. Delineation Map and Potential Contaminant Source Locations



Section 3. Susceptibility Analyses

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheet for the system. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity is high for all three wells (Table 3). Regional soils data within the entire area of the delineations show that the soils are considered to be in the moderate to well-drained class. In addition, the water table for Well #5 PLP/PPR is located at approximately 79 feet below ground surface (bgs). The available well log does not identify at least 50-feet of low permeability sedimentary interbeds between the basalt layers that could retard the downward movement of contaminants.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

Well #1 SWML W has a moderate system construction score, mainly due to a lack of well log information. The well, drilled in 1952, is 350 feet deep. The casing is of varying thicknesses and unknown diameters. 12-inch diameter casing terminates 12 inches above an elevated concrete floor and extends 54 feet bgs. 10-inch diameter casing extends to 135 feet bgs. The wellhead and surface seal are in compliance with regulations, and the well is protected from surface flooding.

Well #2 SWML E has a moderate system construction score, mainly due to a lack of well log information. The well, drilled in 1965, is 152 feet deep. The casing is of varying thicknesses and unknown diameters. 12-inch diameter casing terminates 12 inches above an elevated concrete floor and reduce to 10-inch diameter casing that extends to an unknown depth. The wellhead and surface seal are in compliance with regulations, and the well is protected from surface flooding.

Well #5 PLP/PPR has a moderate system construction score. The well, drilled in 1981, is 440 feet deep. 0.375-inch thick, 14-inch diameter casing extends from ground surface to 22 feet bgs and 0.250-inch thick, 12-inch diameter casing extends from ground surface to 440 feet bgs into black basalt. The annular seal is set to 40 feet bgs into black basalt. Perforations extend from 44 feet to 440 feet bgs. The well log identifies the producing fracture from 438 to 440 feet bgs. The wellhead and surface seal are in compliance with regulations, and the well is protected from surface flooding.

A determination was made as to whether current public water system (PWS) construction standards are being met. Though the wells may have been in compliance with standards when they were completed, current PWS well construction standards are more stringent. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. These standards include provisions for well screens, pumping tests, and casing thicknesses to name a few. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. 10-inch diameter wells require a casing thickness of at least 0.365-inches and 12-inch diameter and larger casing requires 0.375-inch thick casing. The wells were assessed an additional point in the system construction rating.

Potential Contaminant Source and Land Use

Wells #1 SWML W and #2 SWML E share the same delineation and have the same land use scores as follows: high land use for VOCs (i.e. petroleum products, chlorinated solvents), moderate for IOCs (i.e. nitrates, arsenic) and SOCs (i.e. pesticides), and low for microbial contaminants (i.e. bacteria). Well #5 PLP/PPR rates moderate land use for IOCs, VOCs, and SOCs, and low for microbial contaminants. Local commercial and manufacturing land uses in the delineated source areas account for the largest contribution of points to the potential contaminant inventory ratings. Though the wells are in a county with high levels of herbicide use, this contribution of SOCs was not added into the rating because the delineations mainly encompass urban areas.

Final Susceptibility Ranking

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, if there are contaminant sources located within 50 feet of the source then the wellhead will automatically get a high susceptibility rating. In this case, Well #1 SWML W automatically rated high for VOCs to detections of Dichloromethane and TCE at the wellhead. Well #2 SWML E automatically scores high for VOCs due to the multiple detections of Cis-1,2-Dichloroethylene, Tetrachloroethylene, and TCE at the wellhead. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and agricultural land contribute greatly to the

overall ranking. In terms of total susceptibility, Wells #1 SWML W and #2 SWML E rates high for IOCs, VOCs, SOCs, and microbial contaminants. Well #5 PLP/PPR rates moderate for all categories.

Table 3. Summary of Potlatch Corporation Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
#1 SWML W	H	M	H	M	L	M	H	H*	H	H
#2 SWML E	H	M	H	M	L	M	H	H*	H	H
#5 PLP/PPR	H	M	M	M	L	M	M	M	M	M

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = Well scores automatically high due to VOC detections of Dichloromethane, Cis-1,2-Dichloroethylene, Tetrachloroethylene, and Trichloroethylene.

Susceptibility Summary

Overall, Well #1 SWML W and Well #2 SWML E rate high for IOCs, VOCs, SOCs, and for microbial contaminants. Well #5 PLP/PPR rates moderate for all categories.

The most significant potential water problem currently affecting Potlatch Corporation is that of volatile organic contamination. In October 1998, Well #1 SWML W water had VOC detections of Dichloromethance and TCE. TCE was also detected in September 1999. In September 1993, Well #2 SWML E water had VOC detections of Cis-1,2-Dichloroethylene, Tetrachloroethylene, and TCE. TCE has also been detected in Well #2 SWML E water in February 1997, September 1997, December 1997, February 1998, September 1998, and September 1999.

Another concern for the system is the recurring problem of the disinfection byproducts bromodichloromethane, bromoform, chlorodibromomethane, and chloroform. These VOC contaminants have been detected from 1993 to 1998. They are the result of chlorination practices, and are not considered to be associated with the source water.

The IOCs antimony, arsenic, barium, beryllium, cadmium, chromium, fluoride, mercury, nitrate, selenium, and thallium have been detected in routine water well samples, but each chemical has been below the MCLs as set by the EPA. No SOCs or bacterial contaminants have ever been detected in the tested water.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Potlatch Corporation system, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey, including protection of the well from contamination sources within 50 feet of the wellhead. Also, disinfection practices should be maintained. No chemicals should be stored or applied within the 50-foot radius of the wellhead. The source of the TCE in the water should be investigated and remediated. Since much of the designated protection areas are outside the direct jurisdiction of the Potlatch Corporation, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of source water protection. In addition, the well should maintain sanitary survey standards regarding wellhead protection.

Appropriate disinfection practices need to be maintained in a way to protect the drinking water from disinfection by-products, a result of the chlorination disinfection. Though water cannot be totally free of by-products when disinfection is used, they can be reduced by treatment modifications. For disinfection by-product control strategies, see http://www.epa.gov/safewater/mdbp/pdf/alter/ chapt_2.pdf.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation encompasses much urban and residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are transportation corridors through the delineations, the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Lewiston Regional DEQ Office (208) 799-4370

State DEQ Office (208) 373-0502

Website: http://www2.state.id.us/deq

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper, Idaho Rural Water Association, at 208-343-7001 (mharper@idahoruralwater.com) for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund@ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Cohen, P.L. and Ralston, D.R.; 1980; Reconnaissance study of the "Russell" Basalt aquifer in the Lewiston Basin of Idaho and Washington, Research Technical Completion Report, Idaho Water Resources Research Institute, University of Idaho, 164p.

Crosthwaite, E.G; 1989; Results of Testing Exploratory Wells, Nez Perce Reservation, ID. Contractor (P.G.) report.

EPA; 1988; Support Document for Designation of the Lewiston Basin Aquifer as a Sole Source Aquifer. Office of Ground Water. EPA 910/0-88-194.

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Hydrology Program; 1984; Analysis of Aquifer Test Data from the Grande Ronde Formation, Clarkston, Washington, and Lewiston Idaho. Department of Geology and Geological Engineering, University of Idaho, Moscow, Idaho 83843.

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Department of Environmental Quality, 1999. Sanitary Survey for PWS #2350024. September 1999.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Wyatt-Jaykim Engineers; 1994; Lewiston Basin deep aquifer study, Prepared for Lewiston Orchards Irrigation District (LOID).

Attachment A

Potlatch Corporation
Susceptibility Analysis
Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : POTLATCH CORP LEWISTON Well# : WELL #1 SWML W

Public Water System Number 2350024 05/15/2002 2:17:29 PM

1. System Construction		SCORE				
Drill Date	11/27/1952					
Driller Log Available	YES					
Sanitary Survey (if yes, indicate date of last survey)	YES	1998				
Well meets IDWR construction standards	NO	1				
Wellhead and surface seal maintained	YES	0				
Casing and annular seal extend to low permeability unit	NO	2				
Highest production 100 feet below static water level	NO	1				
Well located outside the 100 year flood plain	YES	0				
Total System Construction Score		4				
2. Hydrologic Sensitivity						
Soils are poorly to moderately drained	NO	2				
Vadose zone composed of gravel, fractured rock or unknown	YES	1				
Depth to first water > 300 feet	NO	1				
Aquitard present with > 50 feet cumulative thickness	NO	2				
Total Hydrologic Score		6				
3. Potential Contaminant / Land Use - ZONE 1A			IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2	
Farm chemical use high	NO	0	0	0		
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	YES	NO	NO	
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2	
Potential Contaminant / Land Use - ZONE 1B						
Contaminant sources present (Number of Sources)	YES	6	7	7	3	
(Score = # Sources X 2) 8 Points Maximum		8	8	8	6	
Sources of Class II or III leacheable contaminants or	YES	2	5	2		
4 Points Maximum		2	4	2		
Zone 1B contains or intercepts a Group 1 Area	YES	0	2	0	0	
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone 1B		10	14	10	6	
Potential Contaminant / Land Use - ZONE II						
Contaminant Sources Present	YES	2	2	2		
Sources of Class II or III leacheable contaminants or	YES	1	1	1		
Land Use Zone II	Less than 25% Agricultural Land	0	0	0		
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0	
Potential Contaminant / Land Use - ZONE III						
Contaminant Source Present	YES	1	1	1		
Sources of Class II or III leacheable contaminants or	YES	1	1	1		
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0		
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0	
Cumulative Potential Contaminant / Land Use Score		17	21	17	8	

4. Final Susceptibility Source Score			13	14	13	13
5. Final Well Ranking			High	High	High	High

Ground Water Susceptibility Report Public Water System Name : POTLATCH CORP LEWISTON Well# : WELL #2 SWML E

Public Water System Number 2350024 05/15/2002 2:17:41 PM

1. System Construction		SCORE
Drill Date	11/27/1952	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	1998
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
	Total System Construction Score	4

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
	Total Hydrologic Score	6

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	YES	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	6	7	7	3
(Score = # Sources X 2) 8 Points Maximum		8	8	8	6
Sources of Class II or III leacheable contaminants or	YES	2	5	2	
4 Points Maximum		2	4	2	
Zone 1B contains or intercepts a Group 1 Area	YES	0	2	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		10	14	10	6
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III					

Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		17	21	17	8
4. Final Susceptibility Source Score		13	14	13	13
5. Final Well Ranking		High	High	High	High

Ground Water Susceptibility Report Public Water System Name : POTLATCH CORPORATION LEWISTON Well# : PLP/PPR WELL #5

Public Water System Number 2350024 03/29/2002 10:46:59 AM

1. System Construction		SCORE
Drill Date	09/30/1981	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	1998
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	YES	0
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		3

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		6

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	3	3	3	2
(Score = # Sources X 2) 8 Points Maximum		6	6	6	4
Sources of Class II or III leacheable contaminants or	YES	2	2	2	
4 Points Maximum		2	2	2	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		8	8	8	4
Potential Contaminant / Land Use - ZONE II					

Contaminant Sources Present		YES	2	2	2	
Sources of Class II or III leacheable contaminants or		YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land		0	0	0	
Potential Contaminant Source / Land Use Score - Zone II			3	3	3	0
Potential Contaminant / Land Use - ZONE III						
Contaminant Source Present		YES	1	1	1	
Sources of Class II or III leacheable contaminants or		YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of		NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III			2	2	2	0
Cumulative Potential Contaminant / Land Use Score			15	15	15	6
4. Final Susceptibility Source Score			12	12	12	11
5. Final Well Ranking			Moderate	Moderate	Moderate	Moderate